

Hypervelocity Code to Design Light Gas Guns to Achieve 10km/s+

Completed Technology Project (2012 - 2013)



Project Introduction

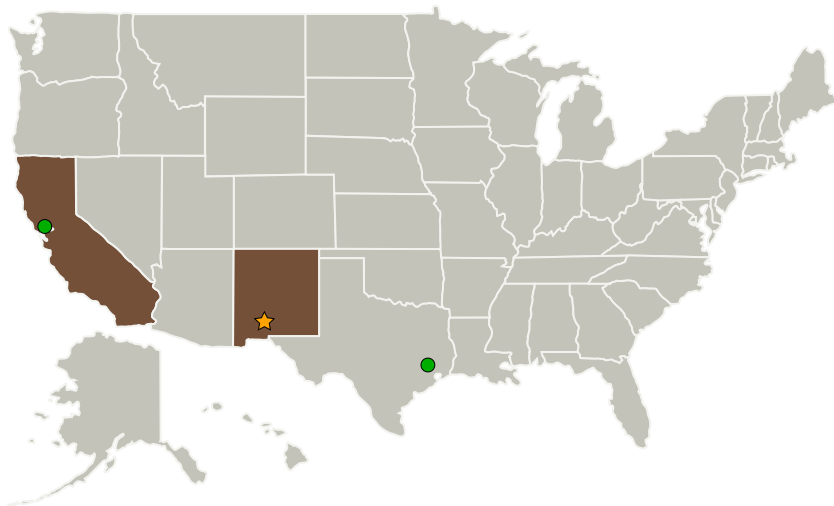
Create a validated three stage light gas gun (3SLGG) code, running over 400 iterations providing the optimal geometries to enable the design, build and safe implementation of a 3SLGG at the White Sands Test Facility Remote Hypervelocity Test Laboratory.

With over 100,000,000 particles smaller than 1 cm in low earth orbit, it is critical that shielding will adequately protect from impacts of this size. A 3SLGG is a validated method to accelerate small particles up to 10 km/s. Enabling WSTF to simulate the average LEO velocity of 10 km/s will provide the means to validate ballistic limit equations used to design protective shields. The first phase was accomplished using the 3SLGG code, which provided the optimal beginning geometric and pressure parameters. The next phase will include fabrication of the components, development of procedures, safety/design reviews and build up of the launcher system.

Anticipated Benefits

The ability to cost effectively impact candidate shielding with particles at the velocities that currently exist in the low earth orbit environment will improve the science of protecting these systems. Improvements in shielding will benefit the design of shielding systems by reducing the risk of hypervelocity impact impingement in the space environment.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
★ White Sands Test Facility(WSTF)	Lead Organization	NASA Facility	Las Cruces, New Mexico
● Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California
ERC Inc.	Supporting Organization	Industry	
Jacobs Engineering Group, Inc.	Supporting Organization	Industry	Dallas, Texas
● Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations

California	New Mexico
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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

White Sands Test Facility (WSTF)

Responsible Program:

Center Innovation Fund: JSC CIF

Project Management

Program Director:

Michael R Lapointe

Program Manager:

Carlos H Westhelle

Project Manager:

Karen M Rodriguez

Principal Investigator:

Karen M Rodriguez

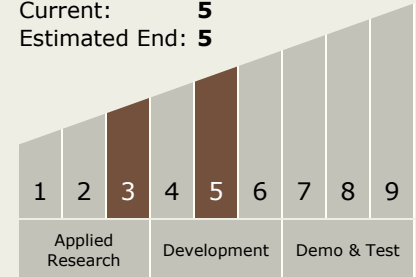
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Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
 - └ TX06.5 Radiation
 - └ TX06.5.3 Protection Systems